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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/840,667	04/23/2001	Kazuhiro Yamada	NAK1-BO60	4146

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EXAMINER	
ANYASO, UCHENDU O	
ART UNIT	PAPER NUMBER
2675	

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/840,667	YAMADA ET AL.	
	Examiner	Art Unit	
	Uchendu O Anyaso	2675	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5-12,23 and 28* is/are allowed.

6)☒ Claim(s) *1-4,13-22,24-27 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. **Claims 1-29** are pending in this action.

Claim Rejections - 35 USC ' 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 3** and **4**, are rejected under 35 U.S.C. 102(b) as being anticipated by *Awamoto* (U.S. 5,898,414).

Regarding **claim 3**, Awamoto teaches a PDP image display including a panel having a first electrode which extends in a first direction to write image data and a second electrode which extends in a second direction to select a display line (figure 7 at 1, 2, 5), wherein a field period is divided into a plurality of subfields that each have a predetermined luminance weight, and a grayscale image for the field period is displayed by writing subfield image data of each subfield period obtained by dividing input image data of the field period into the plurality of subfield periods, into the panel through first electrode and the second electrode (column 1, lines 33-38) and sustaining an illumination state of on and off in each cell for each subfield period using luminance equivalent to a luminance weight of each subfield period based on the written sub-field image data (column 1, lines 27-38).

Furthermore, Awamoto teaches how a subfield period are uniformly ON by teaching a display control circuit that varies a light producing period during each of j subframes such that the display control circuit controls a total light producing period within one frame so that the total light producing period remains constant (column 2, lines 36-41).

Regarding **claim 4**, Awamoto teaches a PDP image display including a panel having a first electrode which extends in a first direction to write image data and a second electrode which extends in a second direction to select a display line (figure 7 at 1, 2, 5), wherein a field period is divided into a plurality of subfields that each have a predetermined luminance weight, and a grayscale image for the field period is displayed by writing subfield image data of each subfield period obtained by dividing input image data of the field period into the plurality of subfield periods, into the panel through first electrode and the second electrode (column 1, lines 33-38) and sustaining an illumination state of on and off in each cell for each subfield period using luminance equivalent to a luminance weight of each subfield period based on the written sub-field image data (column 1, lines 27-38).

Furthermore, Awamoto teaches how the frame cycle for input display data gets shorter, that is, when the frame frequency increases, control is given automatically so that the number of low-order subframes during which interlaced-scanning display is carried out increases such that a display operation can therefore be carried out without any decrease in the number of subframes. Also, by contrast, when the frame cycle for input display data gets longer, that is, when the frame frequency decreases, control is given automatically so that the number of low-

order subframes during which interlaced-scanning display is carried out decreases (column 9, lines 25-43, figure 9).

Furthermore, the display control circuit varies a light producing period during each of j subframes such that the display control circuit controls a total light producing period within one frame so that the total light producing period remains constant (column 2, lines 36-41).

Claim Rejections - 35 USC ' 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1, 2, 14, 15, 20- 22** and **25-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Awamoto* (U.S. 5,898,414) in view of *Tajima* (EP 0945844).

Regarding **claims 1** and **2**, Awamoto teaches a PDP image display including a panel having a first electrode which extends in a first direction to write image data and a second electrode which extends in a second direction to select a display line (figure 7 at 1, 2, 5), wherein a field period is divided into a plurality of subfields that each have a predetermined luminance weight, and a grayscale image for the field period is displayed by writing subfield image data of each subfield period obtained by dividing input image data of the field period into the plurality of subfield periods, into the panel through first electrode and the second electrode (column 1, lines 33-38) and sustaining an illumination state of on and off in each cell for each subfield period

using luminance equivalent to a luminance weight of each subfield period based on the written sub-field image data (column 1, lines 27-38).

However, Awamoto does not teach an image changing unit that changes a part of the subfield image data so that a total number of charges and discharges performed on a first electrode when writing becomes smaller. On the other hand, Tajima teaches this concept of achieving smaller charges and discharges by teaching a method of driving displays comprising a sequence changing unit for changing a sequence of scanning electrodes to minimize power consumption associated with charging and discharging the electrodes (column 2, lines 23-31; column 1, lines 3-28, 35-40).

Thus, it would have been obvious to a person of ordinary skill in the art to combine Awamoto and Tajima's inventions because while Awamoto teaches how a PDP image display sustains an illumination state of on and off in each cell for each subfield period using luminance equivalent to a luminance weight of each subfield period based on the written sub-field image data (column 1, lines 27-38), Tajima teaches a means for minimizing power consumption by a sequence changing unit for changing a sequence of scanning electrodes such that the charging and discharging performed on the electrode is minimized (column 2, lines 23-31; column 1, lines 3-28, 35-40). The motivation for combining these invention would have been to minimize power consumption on the display device without deteriorating the quality of displayed images (column 1, lines 50-53).

Regarding **claims 14, 15, 20** and **25**, in further discussion of claims 1 and 2, Tajima teaches how to achieve smaller charges and discharges by teaching a method of driving displays

comprising a sequence changing unit for changing a sequence of scanning electrodes to minimize power consumption associated with charging and discharging the electrodes (column 2, lines 23-31; column 1, lines 3-28, 35-40).

Regarding **claims 21, 22, 26** and **27**, in further discussion of claims 3 and 4, Awamoto does not teach an image changing unit that changes a part of the subfield image data only when the predetermined subfield period has a smaller luminance weight. On the other hand, Tajima teaches this concept of achieving smaller charges and discharges by teaching a method of driving displays comprising a sequence changing unit for changing a sequence of scanning electrodes to minimize power consumption associated with charging and discharging the electrodes (column 2, lines 23-31; column 1, lines 3-28, 35-40).

Thus, it would have been obvious to a person of ordinary skill in the art to combine Awamoto and Tajima's inventions because while Awamoto teaches how a PDP image display sustains an illumination state of on and off in each cell for each subfield period using luminance equivalent to a luminance weight of each subfield period based on the written sub-field image data (column 1, lines 27-38), Tajima teaches a means for minimizing power consumption by a sequence changing unit for changing a sequence of scanning electrodes such that the charging and discharging performed on the electrode is minimized (column 2, lines 23-31; column 1, lines 3-28, 35-40). The motivation for combining these invention would have been to minimize power consumption on the display device without deteriorating the quality of displayed images (column 1, lines 50-53).

6. **Claims 13, 16, 17** and **19** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Okano* (U.S. 6,025,818) in view of *Awamoto* (U.S. 5,898,414).

Regarding **independent claims 13, 16, 17** and **19**, Okano teaches a self-luminous display panel driving system wherein one field of a composite video signal is divided into N sub-fields, luminance of each pixel is set by a pixel data such that the pixel data comprises N bits corresponding to the number of the sub-field (see Abstract).

Furthermore, Okano teaches how a pixel data of a pixel is compared with a prior pixel data of a same pixel and a change between a data of a highest luminance and a data of a luminance of a one digit lower is detected wherein an inter-frame change signal is produced when a change is detected such that the present pixel data is corrected so as to change the sub-field of the present pixel data (see Abstract).

Also, Okano teaches an image data storing means by teaching pixel data memory 30, 32 (column 4, lines 66 through column 5, line 9, figure 2 at 30, 32).

Furthermore, Okano teaches a pattern detecting means by teaching detecting circuits 33_1 and 34_1 that detect the changing patterns of the changing patterns A_2 and A_4 (column 6, lines 18-22, figure 3 at 33_1 and 34_1).

Furthermore, Okano teaches an image changing unit for changing a part sub-field image data of a predetermined sub-field period by teaching a method of for correcting pixel data in a self-luminous display panel driving system, wherein one field of a composite video signal is divided into N sub-fields, luminance of each pixel is set by a pixel data comprising N bits corresponding to the number of the sub-field and each of digit positions of the N bits represents a weight for the luminance comprising steps of comparing a present pixel data of a pixel with a

prior pixel data of a same pixel, detecting whether there is a change between a data of a highest luminance and a data of a luminance of a one digit lower in the comparison, and producing an inter-frame change signal when a **change** is detected, correcting the present pixel data in response to the inter-frame change signal so as to change the sub-field of the present pixel data (column 2, lines 58 through column 3, lines 8).

However, Okano does not teach how to read subfield image data of a subfield period whose luminance weight is smaller that the predetermined subfield period from the image data storing means, changing a corresponding part of the read subfield image data so that the cells corresponding to the pixels which form the corresponding part of the subfield image data are uniformly ON in the subfield period. On the other hand, Awamoto teaches this concept by teaching how a subfield period is uniformly ON by teaching a display control circuit that varies a light producing period during each of j subframes such that the display control circuit controls a total light producing period within one frame so that the total light producing period remains constant (column 2, lines 36-41).

Thus, it would have been obvious to a person of ordinary skill in the art to combine Okano and Awamoto because while Okano teaches a method of for correcting pixel data in a self-luminous display panel driving system, wherein one field of a composite video signal is divided into N sub-fields, luminance of each pixel is set by a pixel data comprising N bits corresponding to the number of the sub-field and each of digit positions of the N bits represents a weight for the luminance comprising steps of comparing a present pixel data of a pixel with a prior pixel data of a same pixel, Awamoto teaches how a subfield period is uniformly ON by teaching a display control circuit that varies a light producing period during each of j subframes

such that the display control circuit controls a total light producing period within one frame so that the total light producing period remains constant (column 2, lines 36-41). The motivation for combining these inventions would have been to reduce the number of flicker in a display device (column 2, lines 3-7).

Furthermore, Awamoto teaches how a grayscale image for a field period is displayed by writing subfield image data of each subfield period obtained by dividing input image data of a field period into the plurality of subfield periods, and sustaining an illumination state of on and off in each cell for each subfield period using luminance equivalent to a luminance weight of each subfield period based on the written sub-field image data (column 1, lines 27-38).

Regarding **claims 24** and **29**, in further discussion of claims 3 and 4, Okano teaches an image changing unit for changing a part sub-field image data of a predetermined sub-field period by teaching a method of for correcting pixel data in a self-luminous display panel driving system, wherein one field of a composite video signal is divided into N sub-fields, luminance of each pixel is set by a pixel data comprising N bits corresponding to the number of the sub-field and each of digit positions of the N bits represents a weight for the luminance comprising steps of comparing a present pixel data of a pixel with a prior pixel data of a same pixel, detecting whether there is a change between a data of a highest luminance and a data of a luminance of a one digit lower in the comparison, and producing an inter-frame change signal when a **change** is detected, correcting the present pixel data in response to the inter-frame change signal so as to change the sub-field of the present pixel data (column 2, lines 58 through column 3, lines 8).

Allowable Subject Matter

7. **Independent claim 5,** and dependent **claims 6-12, 23** and **28** are allowed.

None of the references, either singularly or in combination, teach or fairly suggest an image display device wherein the cells corresponding to the pixels which form the part of the subfield image data are uniformly one of ON and OFF in the predetermined subfield period, if the luminance weight of the predetermined subfield period is the **smallest** weight.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 6,268,838 to *Kim* for a method and circuit for driving PDP.

U.S. Patent 6,243,073 to *Kawamura et al* for a video display monitor.

U.S. Patent 6,448,960 to *Shigeta* for a driving method of plasma display panel.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Uchendu O. Anyaso whose telephone number is (703) 306-5934. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Saras, can be reached at (703) 305-9720.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, 6th Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Uchendu O. Anyaso

09/20/2003

DENNIS-DOON CHOW
PRIMARY EXAMINER